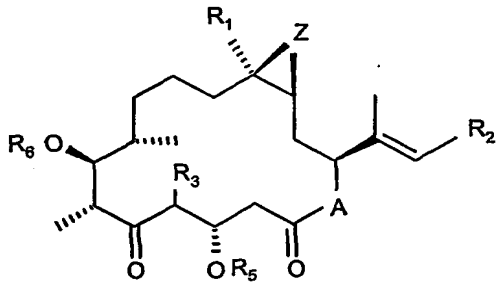
What is claimed is:

1. An epothilone of formula I



(I)

wherein

A represents O or NR_7,

R_1 is hydrogen or lower alkyl which is unsubstituted or substituted by hydroxy, lower acyloxy, lower alkanoyl in free or protected form, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino, or lower acyl amino,

R_2 is unsubstituted or substituted heteroaryl having at least one nitrogen atom,

R_3 represents hydrogen or lower alkyl,

R_5 and R_6 are hydrogen, and

R_7 is hydrogen or lower alkyl,

Z is O or a bond,

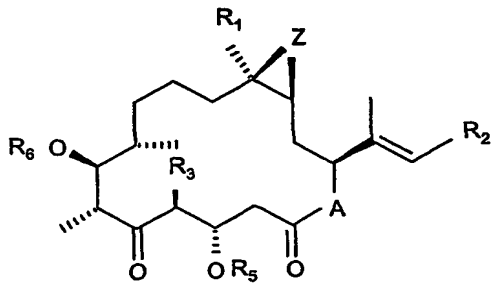
under the proviso that

when R_2 is 2-methyl-thiazolyl and Z is O, R_1 represents lower alkyl which is unsubstituted or substituted by hydroxy, lower acyloxy, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino or lower acyl amino, and

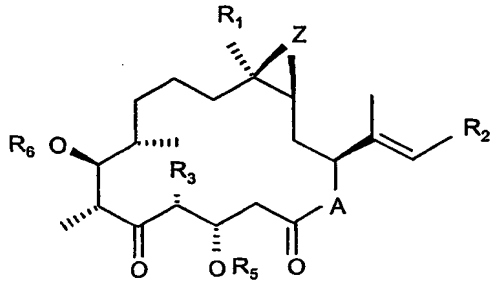
when R_2 is 2-methyl-thiazolyl and Z is a bond, R_1 represents lower alkyl which is substituted by hydroxy, lower acyloxy, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino or lower acyl amino,

or a salt thereof.

2. An epothilone of formula Ia or Ib



(Ia)



(Ib)

wherein

A represents O or NR_7,

R_1 is hydrogen or lower alkyl which is unsubstituted or substituted by hydroxy, lower acyloxy, lower alkanoyl in free or protected form, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino, or lower acyl amino,

R_2 is unsubstituted or substituted heteroaryl having at least one nitrogen atom,

R_3 represents hydrogen or lower alkyl,

R_5 and R_6 are hydrogen, and

R_7 is hydrogen or lower alkyl,

Z is O or a bond,

under the proviso that

when R_2 is 2-methyl-thiazolyl and Z is O, R_1 represents lower alkyl which is unsubstituted or substituted by hydroxy, lower acyloxy, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino or lower acyl amino, and

when R_2 is 2-methyl-thiazolyl and Z is a bond, R_1 represents lower alkyl which is substituted by hydroxy, lower acyloxy, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino or lower acyl amino,

or a salt thereof.

3. The epothilone of formula I according to claim 1 or of formula Ia or Ib according to claim 2, wherein

A represents O or NR_7,

R_1 is hydrogen or lower alkyl which is unsubstituted or substituted by hydroxy, lower acyloxy, lower alkanoyl in free or protected form, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino, or lower acyl amino,

R_2 is thiazolyl, oxazolyl, pyridyl, benzothiazolyl, benzoxazolyl or benzoimidazolyl, which in each case is substituted or unsubstituted,

R_3 represents hydrogen or lower alkyl,

R_5 and R_6 are hydrogen, and

R_7 is hydrogen or lower alkyl,

Z is O or a bond,

under the proviso that

when R_2 is 2-methyl-thiazolyl and Z is O, R_1 represents lower alkyl which is unsubstituted or substituted by hydroxy, lower acyloxy, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino or lower acyl amino, and

when R_2 is 2-methyl-thiazolyl and Z is a bond, R_1 represents lower alkyl which is substituted by hydroxy, lower acyloxy, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino or lower acyl amino,

or a salt thereof.

4. The epothilone of formula I according to claim 1 or of formula Ia or Ib according to claim 2, wherein

A represents O or NR_7,

R_1 is hydrogen or lower alkyl which is unsubstituted or substituted by hydroxy, lower acyloxy, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino or lower acyl amino,

R_2 is thiazolyl, oxazolyl, pyridyl, benzothiazolyl, which in each case is substituted or unsubstituted,

R_3 represents hydrogen or lower alkyl,

R_5 and R_6 are hydrogen, and

R_7 is hydrogen or lower alkyl,

Z is O or a bond,

under the proviso that

when R_2 is 2-methyl-thiazolyl and Z is O, R_1 represents lower alkyl which is unsubstituted or substituted by hydroxy, lower acyloxy, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino or lower acyl amino, and

when R_2 is 2-methyl-thiazolyl and Z is a bond, R_1 represents lower alkyl which is substituted by hydroxy, lower acyloxy, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino or lower acyl amino,

or a salt thereof.

5. The epothilone of formula I according to claim 1 or of formula Ia or Ib according to claim 2, wherein

A represents O,

R_1 is hydrogen or lower alkyl,

R_2 is 2-methyl-thiazolyl, 2-ethyl-thiazolyl, 2-methylthio-thiazolyl, 2-aminomethyl-thiazolyl, 2-dimethylamino-thiazolyl, 2-fluoromethyl-thiazolyl, 2-methyl-oxazolyl, 3-methyl-pyridinyl, 2-methyl-benzothiazolyl,

R_3 represents hydrogen or lower alkyl,

R_5 and R_6 are hydrogen, and

Z is O or a bond,

under the proviso that when R_2 is 2-methyl-thiazolyl, Z is O and R_1 represents lower alkyl,

or a salt thereof.

6. The epothilone of formula I according to claim 1 or of formula Ia or Ib according to claim 2, wherein

A represents O,

R_1 is hydrogen or lower alkyl,

R_2 is 2-methyl-thiazolyl, 2-ethyl-thiazolyl, 2-methylthio-thiazolyl, 2-aminomethyl-thiazolyl, 2-dimethylamino-thiazolyl, 2-fluoromethyl-thiazolyl, 2-methyl-oxazolyl, 3-methyl-pyridinyl, 2-methyl-benzothiazolyl,

R_3 represents methyl,

R_5 and R_6 are hydrogen, and

Z is O or a bond,

under the proviso that when R_2 is 2-methyl-thiazolyl, Z is O and R_1 represents lower alkyl,

or a salt thereof.

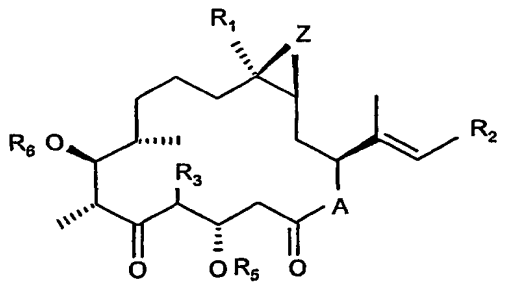
7. A pharmaceutical composition, comprising an epothilone of formula I or of formula Ia or Ib, or a pharmaceutically acceptable salt thereof, provided that salt-forming groups are present, according to one of claims 1 to 6, and one or more pharmaceutically acceptable carriers.

8. Use of an epothilone of formula I or of formula Ia or Ib according to one of claims 1 to 6 for the treatment of a tumour disease.

9. Use of an epothilone of formula I or of formula Ia or Ib according to one of claims 1 to 6 for the preparation of a pharmaceutical product for the treatment of a tumour disease.

10. A method for treatment of warm-blooded animals, including humans, in which an therapeutically effective amount of an epothilone of the formula I or of formula Ia or Ib according to any one of claims 1 to 6 or a pharmaceutically acceptable salt of such a compound is administered to a warm-blooded animal suffering from a tumour disease.

11. A process for the preparation of an epothilone of formula I,



(I)

wherein

A represents O or NR_7,

R_1 is hydrogen or lower alkyl which is unsubstituted or substituted by hydroxy, lower acyloxy, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino or lower acyl amino,

R_2 is unsubstituted or substituted heteroaryl having at least one nitrogen atom,

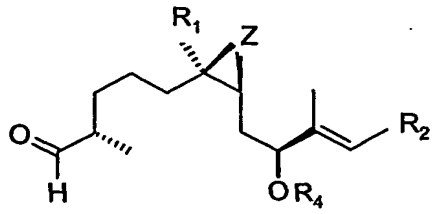
R_3 represents hydrogen or lower alkyl,

R_5 and R_6 are hydrogen, and

R_7 is hydrogen or lower alkyl,

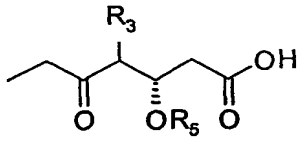
Z is O or a bond,

wherein an aldehyde of formula II



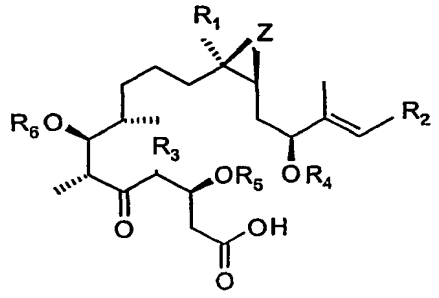
(II)

wherein R_1, R_2 and Z have the meanings as provided above for a compound of formula I and R_4 is a protecting group, is reacted in a first step with an ethylketone of formula III,



(III)

wherein R_5 is H or a protecting group different or identical to R_4 and R_3 has the meaning as provided above for a compound of formula I, to provide the aldol of formula IV,



(IV)

wherein R_1, R_2, R_3 and Z have the meanings as provided above for a compound of formula I, R_4 a protecting group, R_5 is H or a protecting group different or identical to R_4 and R_6 is hydrogen,

which aldol of formula IV is reacted in a second step with a reagent capable to introduce a protecting group which is different or identical to R_4 furnishing a carboxylic acid of formula IV,

wherein R_1, R_2, R_3 and Z have the meanings as provided above for a compound of formula I, R_4 a protecting group and R_5 is H or R_5 and R_6 are protecting groups different or identical to R_4,

which carboxylic acid of formula IV is reacted in a third step with a reagent capable to remove the protecting group R_4 under conditions which do not result in the removal of the protecting groups R_5 and R_6 providing a carboxylic acid of formula IV,

wherein R_1, R_2, R_3 and Z have the meanings as provided above for a compound of formula I, R_4 is hydrogen and R_5 is H or R_5 is H or R_5 and R_6 are protecting groups,

which carboxylic acid of formula IV in a fourth step is subject of a macrolactonisation reaction providing the epothilone of formula I,

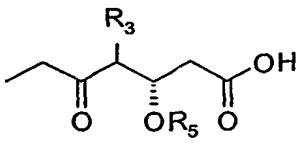
wherein R_1, R_2, R_3 and Z have the meanings as provided above for a compound of formula I, A is O and R_5 is H or R_5 and R_6 are protecting groups,

which epothilone of formula I is reacted in a fifth step with a reagent capable to remove the protecting groups R_5 and R_6 furnishing an epothilone of formula I,

wherein R_1, R_2, R_3, R_5, R_6 and Z have the meanings as provided above for a compound of formula I and A is O,

which epothilone of formula I is, optionally, further transformed into an epothilone of formula I wherein R_1, R_2, R_3, R_5, R_6 and Z have the meanings as provided above for a compound of formula I and A is NR_7, wherein R_7 is hydrogen or lower alkyl.

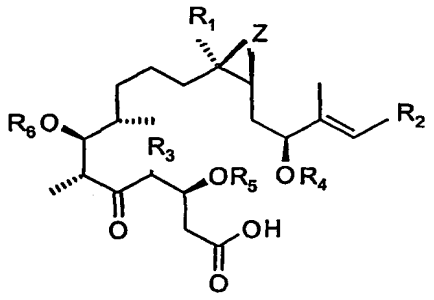
12. An ethylketone of formula III,



(III)

wherein R_3 has the meaning as provided above for a compound of formula I and R_5 is hydrogen or a protecting group.

13. An aldol of formula IV,



(IV)

R_1 is hydrogen or lower alkyl which is unsubstituted or substituted by hydroxy, lower acyloxy, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino, lower acyl amino,

R_2 is unsubstituted or substituted heteroaryl,

R_3 represents hydrogen or lower alkyl,

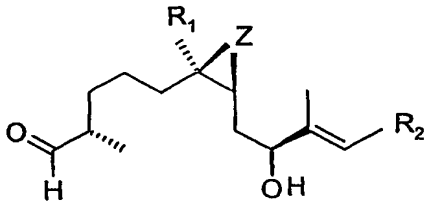
R_4 is hydrogen or a protecting group,

R_5 is a protecting group different or identical to R4,

R_6 is hydrogen or a protecting group different or identical to R4, and

Z is O or a bond.

14. A process for the preparation of an aldehyde of formula II



(II)

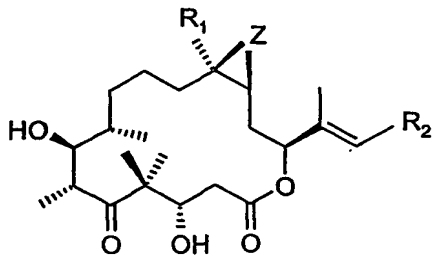
wherein

R_1 is hydrogen or lower alkyl which is unsubstituted or substituted by hydroxy, lower acyloxy, lower alkoxy, halogen, amino, lower alkyl amino, di-lower alkyl amino, lower acyl amino,

R_2 is unsubstituted or substituted heteroaryl,

Z is O or a bond,

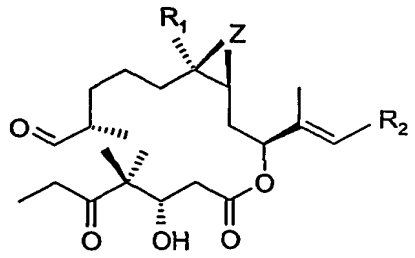
wherein an epothilone of formula V



(V)

wherein the radicals R_1, R_2 and Z have the meanings as provided for a compound of formula II above,

is first reacted with a reagent effecting a retro-aldol reaction furnishing an ester of formula VI



(VI)

wherein the radicals R_1, R_2 and Z have the meanings as provided for a compound of formula II above,

which ester is hydrolized in a second step into its components, 4,4-dimethyl-3-hydroxy-5-oxo-heptanoic acid and the aldehyde of formula II as defined above.

15. A method of separating C4-desmethyl-epothilone B from epothilone G2, which is characterised by chromatography on a Chiralpak-AD column with an eluant containing a lower alkane and a lower alkanol.

16. A process for the production of C4-desmethyl-epothilone B, which comprises the steps of

a) concentrating epothilones in a culture medium for the biotechnological preparation of epothilones, which medium contains a microorganism suitable for the preparation of epothilones, water and other suitable customary constituents of culture media, whereby a

cyclodextrin or a cyclodextrin derivative is added to the medium, or a mixture of two or more of these compounds;

b) separating epothilones from one another, which is characterised by chromatography on a reversed-phase column with an eluant containing a lower alkylcyanide, wherein chromatography is carried out on column material charged with hydrocarbon chains, and an eluant containing a lower alkylnitrile is used; and wherein, if desired, further working up steps and purification steps are possible; and

c) finally separating C4-desmethyl-epothilone B from epothilone G2, by chromatography on a Chiralpak-AD column with an eluant containing a lower alkane, and a lower alkanol.